

Claims

1. Connector assembly for connecting an earpiece (27) of a hearing aid to a glasses temple (13), the glasses temple (13) comprising hearing aid components, the connector assembly (31) comprising a first connector housing (34; 34') and a second connector housing (37; 37'), the first connector housing (34; 34') being designed to be attached to said earpiece (27) via an intermediate unit (29), the second connector housing (37; 37') being designed either to be attached to, or to be part of said glasses temple (13), the first and second connector housings (34, 37; 34', 37') being designed to engage one another by means of a disconnectable connection, wherein said second connector housing (37; 37') comprises a first contact member (35; 35') and a second contact member (36; 36'), said first connector housing (34; 34') comprises a third contact member (30; 30') and a fourth contact member (32; 32'), said first contact member (35; 35') and said third contact member (30; 30') being arranged to contact one another by magnetic force and to allow an electrical current to flow between said first and third contact member, said second contact member (36; 36') and said fourth contact member (32; 32') being arranged to contact one another by magnetic force and to allow an electrical current to flow between said second and fourth contact member.
2. Connector assembly according to claim 1, wherein at least one of said first and third contact member comprises a first magnetic component to provide a first magnetic contact force and a first metal component covering at least a portion of said first magnetic component.
3. Connector assembly according to claim 2, wherein at least one of said second and fourth contact member comprises a second magnetic component to provide a second magnetic contact force and a second metal component covering at least a portion of said second magnetic component.
4. Connector assembly according to claim 3, wherein said first contact member (35; 35') comprises a first metal member (39; 39'), said second contact member (36; 36') comprises a second metal member (38; 38'), said third contact member (30; 30') comprises a third metal member (52; 52'), said fourth contact member (32; 32')

comprises a fourth metal member (54; 54'), said first magnetic component being a permanent magnet (43; 48) forming part of at least one of said first and third contact member.

5 5. Connector assembly according to claim 2, wherein said first contact member (35; 35') comprises a first metal member (39; 39'), said second contact member (36; 36') comprises a second metal member (38; 38'), said third contact member (30; 30') comprises a third metal member (52; 52'), said fourth contact member (32; 32') comprises a fourth metal member (54; 54'), said first magnetic component being a
10 permanent magnet (43; 48) forming part of at least one of said first and third contact member, and said second magnetic component being a further permanent magnet (41; 50) forming part of at least one of said second and fourth contact member.

6. Connector assembly according to claim 4 or 5, wherein said first metal member is
15 a first metal plate (39), said second metal member is a second metal plate (38), said third metal member is a third metal plate (52), and said fourth metal member is a fourth metal plate (54), said first metal plate (39) having a first contact surface to contact a third contact surface of said third metal plate (52), said second metal plate (38) having a second contact surface to contact a fourth contact surface of said fourth metal plate
20 (54).

7. Connector assembly according to claim 5, wherein said first metal member is a first metal box (39') accommodating a first permanent magnet (43), said second metal member is a second metal box (38') accommodating a second permanent magnet (41),
25 said third metal member is a third metal box (52') accommodating a third permanent magnet (48), and said fourth metal member is a fourth metal box (54') accommodating a fourth permanent magnet (50).

8. Connector assembly according to claim 7, wherein said first metal box (39') has a
30 first cavity accommodating said first permanent magnet (43), said second metal box (38') has a second cavity accommodating said second permanent magnet (41), said third metal box (52') has a third cavity accommodating said third permanent magnet (48), said fourth metal box (54') has a fourth cavity accommodating said fourth

permanent magnet (50), said first metal box (39') being arranged to cover said first permanent magnet (43) completely apart from one side in use facing said third permanent magnet (48), said second metal box (38') being arranged to cover said second permanent magnet (41) completely apart from one side in use facing said fourth permanent magnet (50), said third metal box (52') being arranged to cover said third permanent magnet (48) completely apart from one side in use facing said first permanent magnet (43), said fourth metal box (54') being arranged to cover said fourth permanent magnet (50) completely apart from one side in use facing said second permanent magnet (41).

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9. Connector assembly according to claim 5, wherein said permanent magnet (43; 48) comprises a metal coating forming a metal member, and said further permanent magnet (41; 50) comprises a further metal coating forming a further metal member.

15 10. Connector according to claim 9, wherein said metal coating comprises gold, and said further metal coating comprises gold.

11. Connector according to claim 1, wherein said first contact member (35; 35') and said third contact member (30; 30') are arranged to comprise at least one permanent magnet with an electrically conductive wire connected to it, and said second contact member (36; 36') and said fourth contact member (32; 32') are arranged to comprise at least one further permanent magnet with a further electrically conductive wire connected to it.

25 12. Connector assembly according to any of the claims 1-11, wherein said third and fourth contact members (30, 32; 30', 32') are attached to wires (64, 66) extending in said intermediate unit (29) for transporting input signals to a speaker in said earpiece (27).

30 13. Connector assembly according to any of the claim 1-11, wherein said third and fourth contact members (30, 32; 30', 32') are connected to a speaker (33) within said first connector housing (34; 34'), said speaker (33) being arranged to produce sound to be transported to said earpiece via said intermediate unit (29).

14. Connector assembly according to claim 13, wherein said speaker (33) is resiliently connected to said first connector housing (34') by means of two resilient sleeves (68, 82) at opposite sides of said speaker (33).

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15. Connector assembly according to any of the claims 1-14, wherein said third and fourth contact members (30, 32; 30', 32') within said first connector housing (34') are connected to a printed circuit board (56).

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16. Connector assembly according to any of the claims 1-15, wherein said intermediate unit (29) is made of a material that can be custom formed.

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17. Hearing aid arrangement comprising a first connector housing (34; 34') that can be engaged via a disconnectable connection with a second connector housing (37; 37')

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which is arranged on a glasses temple (13), the hearing aid arrangement also comprising an intermediate unit (29) having one end attached to the first connector housing (34; 34') and an earpiece (27) that is connected to an other end of the intermediate unit (29), wherein the first connector housing (34; 34') comprises a third contact member (30; 30') designed to contact a first contact member (35; 35') in the

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second connector housing (37; 37') by magnetic force and to allow an electrical current to flow between said first and third contact member, and the first connector housing (34; 34') comprises a fourth contact member (32; 32') designed to contact a second contact member (36; 36') in the second connector housing (37; 37') by magnetic force and to allow an electrical current to flow between said second and fourth contact

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member.

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18. Glasses temple of a pair of glasses, comprising hearing aid components, the glasses temple comprising a second connector housing (37; 37') arranged to be attached to a first connector housing (34; 34') of a hearing aid arrangement according to claim 17, wherein the second connector housing (37; 37') comprises a first contact member (35; 35') designed to contact a third contact member (30; 30') in the first connector housing (34; 34') by magnetic force and to allow an electrical current to flow between said first and third contact member, and the second connector housing (37;

37') comprises a second contact member (36; 36') designed to contact a fourth contact member (32; 32') in the first connector housing (34; 34') by magnetic force and to allow an electrical current to flow between said second and fourth contact member.

5 19. Glasses temple according to claim 18, wherein said temple is arranged to accommodate a rechargeable battery (70), comprises contact pads (26, 28; 26', 28') arranged to contact said rechargeable battery (70) to supply said rechargeable battery (70) with recharge power, and separate recharge contacts accommodated in said second connector housing (37; 37') connected to said contact pads (26, 28; 26', 28') and
10 arranged to receive said recharge power from an external recharger.

20. Glasses temple according to claim 18 or 19, wherein said glasses temple (13) comprises a hole accommodating said second connector housing such that said second connector housing (37') lies below a surface of said glasses temple (13).

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21. Hearing aid glasses with a glasses temple according to claim 20.

22. Hearing aid assembly comprising a hearing aid arrangement according to claim 17 and hearing aid glasses according to claim 21.

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23. A connector housing (34') designed to be attached to an earpiece (27) via an intermediate unit (29) and to engage a further connector housing (37'), the connector housing (34') accommodating a speaker (33) that is arranged to produce sound to be transported to said earpiece (27) via said intermediate unit (29), wherein said speaker
25 (33) is resiliently connected to said first connector housing (34') by means of two resilient sleeves (68, 82) at opposite sides of said speaker (33).

24. A cradle set comprising a transformer (10) arranged to receive electrical power
30 from a mains and transform said electrical power to battery charging power to charge a first chargeable battery and a cradle housing (11) comprising at least a first opening (6), the first opening (6) comprising a first electrical contact (3) and a second electrical contact (5), the first opening (6) being shaped to receive a rear side portion of a first

glasses temple (13) and the first and second electrical contacts (3, 5) being designed to contact electrical contacts on said rear side portion of said first glasses temple (13) in order to provide said battery charging power to said first glasses temple (13).

5 25. The cradle set according to claim 24, wherein said first opening (6) comprises a clamp (20) designed to resiliently clamp said rear side portion of said first glasses temple (13).

10 26. The cradle set according to claim 25, wherein said clamp (20) is shaped like a circle arc portion and first and second electrical contacts (3, 5) are located on said clamp (20).

15 27. The cradle set according to claim 25, wherein said clamp (20) is separate from said first and second electrical contacts (3, 5), and at least one of said first and second electrical contacts (3, 5) is resilient.

20 28. The cradle set according to any of the claims 25, 26, wherein said clamp (20) is arranged to receive said rear side portion of said first glasses temple (13) under different angles.

25 29. The cradle set according to any of the claims 24-28, wherein the cradle housing (11) comprises a cradle processor (16) arranged to communicate with other communication devices.

30 30. The cradle set according to any of the claims 24-29, wherein the cradle housing (11) comprises a transceiver (18) arranged to receive and transmit data.

35 31. The cradle set according to any of the claims 24-30, wherein the cradle set comprises at least one light (12, 14) in or near to the first opening (6).

40 32. The cradle set according to claim 31, wherein the at least one light (12, 14) comprises one or more light emitting diodes.

33. The cradle set according to claim 31 or 32, wherein the at least one light (12, 14) is connected to a processor arrangement (16) that is arranged to indicate different operation states of the cradle set via said at least one light, e.g., by different light colors or by different light patterns.

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34. The cradle set according to any of the claims 24-33, wherein said cradle housing (11) comprises a second opening (8) comprising a third electrical contact (7) and a fourth electrical contact (9), the second opening (8) being shaped to receive a rear side portion of a second glasses temple and the third and fourth electrical contacts (7, 9) being designed to contact electrical contacts on said rear side portion of said second glasses temple in order to provide battery charging power to a second chargeable battery in said second glasses temple.

35. An hearing aid arrangement comprising a cradle set and hearing aid glasses, the hearing aid glasses being arranged to accommodate at least one rechargeable battery and electrical contacts allowing to receive battery charging power in order to recharge said rechargeable battery, the cradle set being designed to contact said electrical contacts and to provide battery charging power.

36. An hearing aid arrangement according to claim 35, comprising a cradle set according to any of the claims 24-34, the hearing aid glasses comprising at least one glasses temple (13) comprising a rear side portion with electrical contacts for receiving said battery charging power from said cradle set.

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37. An hearing aid arrangement comprising a glasses temple (13) comprising hearing aid components, the hearing aid arrangement being designed to accommodate a rechargeable battery (70) to provide said hearing aid components with a supply voltage, said hearing aid components comprising a processor (60), the hearing aid arrangement further comprising contact pads (26, 28) to provide a charging voltage to said rechargeable battery (70) and contact members (35, 36), said contact members (35, 36) being both connectable to an output of said processor (60) and to said contact pads (26, 28), such that said contact members (35, 36) allow both said processor (60) to send

output signals for a loudspeaker via said contact members (35, 36) and allow an external charging unit to supply a charging voltage to said chargeable battery (70) via said contact members (35, 36).

5 38. An hearing aid arrangement according to claim 37, wherein at least one first diode (168) is located between said output of said processor (60) and said contact members (35, 36) to prevent said charging voltage from reaching said output of said processor (60).

10 39. An hearing aid arrangement according to claim 37 or 38, wherein at least one second diode (172; 170) is located between said contact pads (26, 28) and said contact members (35, 36), the at least one second diode (172; 170) being arranged to prevent said supply voltage of said battery (70) from reaching said contact members (35, 37) when said processor (60) sends said output signals for said loudspeaker via said contact
15 members (35, 36).

40. An hearing aid according to claim 37, wherein the hearing aid arrangement comprises at least one switch (141; 143) arranged to connect said contact members (35, 36) either to said output of said processor (60) or to said contact pads (26, 28).

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41. An hearing aid arrangement according to any of the claims 37 to 40, wherein the hearing aid arrangement comprises a pair of glasses comprising said temple (13).

42. An hearing aid arrangement according to any of the claims 37 to 41, comprising
25 said external charging unit too.

43. An hearing aid arrangement according to claim 42, said external charging unit comprising at least one arm (130; 132) provided with a connector (142; 148) with charging contact members (156, 158; 152, 154) arranged to contact said contact
30 members (35, 36).

44. An hearing aid arrangement according to claim 43, said external charging unit comprising a support block (134) and a guiding mechanism (136) arranged to receive a glasses nose bridge (135) and being movably arranged on said support block (134).
- 5 45. An hearing aid arrangement according to claim 43 or 44, wherein said at least one arm (130; 132) is at least partly made of a flexible material.
46. An hearing aid arrangement according to claim 42, wherein said temple comprises a notch (162), said external charging unit comprising a connector (142; 148) with charging contact members (156, 158; 152, 154) arranged to contact said contact members (35, 36), a support base (160) provided with an alignment unit (164) arranged to align said charging contact members (156, 158; 152, 154) with said contact members (35, 36) in co-operation with said notch (162).
- 10 47. An hearing aid arrangement according to claim 40, said at least one switch (141, 143) being magnetically operable, the hearing aid arrangement comprising said external charging unit that comprises a magnet (144; 150) to operate said at least one switch (141, 143).
- 15 48. A glasses temple (13) comprising a printed circuit board (59) with electrical components (60; 61; 65; 67), a temple housing (73) and a metal plate (51), the temple housing (73) accommodating both said printed circuit board (59) and said metal plate (51), said metal plate (51) being arranged to protect said printed circuit board (59) with electrical components (60; 61; 65; 67).
- 20 49. The glasses temple according to claim 48, wherein said metal plate (51) comprises a narrowed portion (55) at a rear side of said glasses temple (13) that can be bent behind an ear of a user.
- 25 50. The glasses temple according to claim 48, wherein said electrical components (60; 61; 65; 67) are hearing aid components.
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51. The glasses temple according to claim 50, wherein said temple housing (73) comprises a first hole (69) and said hearing aid components comprise at least one microphone (61) with an extension (63) with an opening to receive sound, said temple housing (73) and printed circuit board (59) being designed such that said extension (63) can be put into said first hole (69) by a tilting movement.

52. The glasses temple according to any of the claims 48-51, wherein said temple housing (73) comprises a hole (69) and said electrical components comprise at least one switch (65) with a button (83) to be operated by a user, wherein said printed circuit board (59) comprises a first notch (81) to provide space within said temple housing (73) to accommodate said at least one switch (65).

53. The glasses temple according to any of the claims 48-52, wherein said printed circuit board (59) comprises a processor arrangement (60).

54. The glasses temple according to claim 53, wherein said printed circuit board (59) is provided with a socket (67) connected to said processor arrangement (60).

55. The glasses temple according to claim 54, wherein said printed circuit board (59) comprises a second notch (81) to provide space within said temple housing (73) to accommodate said at least one socket (67).

56. The glasses temple according to any of the claims 48-55, wherein said glasses temple (13) comprises a connector housing (37) to be connected by means of a magnetic force to a further connector housing (34) that is connected to a hearing aid earpiece (27).

57. The glasses temple according to claim 56, wherein said metal plate (51) comprises a hole (53) to accommodate said connector housing (37).

59. The glasses temple according to any of the claims 48-57, wherein said temple housing (73) comprises a space for accommodating a battery which space can be

covered by a cover (15) with the cover positioned at a side of the temple facing a head of a user in use.

59. The glasses temple according to any of the claims 48-58, wherein said temple housing (73) has a circularly shaped rear side portion with two electrical contacts (19, 21) to receive electrical power to charge a battery for the electrical components.

60. Glasses comprising at least one glasses temple according to any of the claims 48-59.

61. Method of updating a hearing aid, comprising:

- a) providing a computer with a computer processor (101) arranged to communicate with other telecommunication devices and storing a computer version of a hearing aid application program;
- b) providing hearing aid glasses with a hearing aid processor (60) arranged to communicate with other telecommunication devices and storing a hearing aid glasses version of said hearing aid application program;
- c) setting up a communication between said computer processor (101) and said hearing aid processor (60);
- d) checking whether said hearing aid glasses version is a more recent version than said computer version of said hearing aid application program;
- e) if said hearing aid glasses version is more recent than said computer version, transferring said hearing aid glasses version to said computer and to store said transferred hearing aid glasses version in said computer as an updated computer version;
- f) if said computer version is more recent than said hearing aid glasses version, transferring said computer version to said hearing aid processor (60) and to store said computer version in said hearing aid processor (60) as updated hearing aid glasses version.

62. Method according to claim 61, wherein said action c) comprises setting up said communication between said computer processor (101) and said hearing aid processor (60) via an intermediate processor.

5 63. Method according to claim 62, wherein said intermediate processor is part of one of a mobile telephone (85), a personal digital assistant (87), and a cradle (1) arranged to charge a battery of said hearing aid.

64. Method according to any of the claims 61-63, wherein said computer is arranged
10 to download said computer version via a telecommunication network (127).

65. A communication assembly comprising a computer and hearing aid glasses, arranged to perform together the method as claimed in any of the claims 59-62.

15 66. Method of giving a command signal to a hearing aid arrangement comprising a rechargeable battery (70), the method comprising:

- providing a charging voltage to said rechargeable battery (70);
- deriving from said charging voltage a command signal;

20 67. Method according to claim 66, wherein said command signal is at least one of a restart and reset command, and said method comprises:

- using said command signal to perform at least one of restarting and resetting said hearing aid arrangement.

25 68. Method according to any of the claims 66 and 67, wherein the charging voltage consists of at least one pattern of different voltages in time, each pattern signifying a different command.

69. Hearing aid arrangement comprising a processor (60) and arranged to
30 accommodate a rechargeable battery (70) for providing a supply voltage to said processor (60), the hearing aid arrangement also comprising contact pads (26, 28) arranged to contact said rechargeable battery (70) and to receive a charging voltage for said rechargeable battery (70), said hearing aid arrangement comprising a controller

(166) arranged to receive said charging voltage and derive a command signal from said charging voltage and to supply said command signal to said processor (60).

5 70. Hearing aid arrangement according to claim 69, said processor (60) being arranged to at least one of restart and reset upon receipt of said command signal.

71. Hearing aid arrangement according to claim 69 or 70, wherein the charging voltage consists of at least one pattern of different voltages in time, each pattern signifying a different command.

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72. Method of selling hearing aid glasses to clients, comprising:

- a) selecting by a client a hearing aid glasses frame from a set of hearing aid glasses frames;
- b) providing said hearing aid glasses frame with lenses in accordance with a
15 prescription relating to client's eyes deviations;
- c) paying by the client of a fee that is substantially less than a total sales price of said hearing aid glasses;
- d) after a trial period, checking whether the client is satisfied with the hearing aid glasses as bought, and:
 - 20 • if so, debiting the total sales price less the fee from said client;
 - if not, allowing the client to keep the glasses and disabling hearing functionality of said hearing aid glasses or exchanging electronics containing temples of said glasses for normal temples, without returning said fee.

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73. The method according to claim 72, wherein said fee is below 20% of said total sales price.

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